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09/530,099	04/25/2000	OSAMU YOKOYAMA	105928	1092

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EXAMINER	
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ART UNIT	PAPER NUMBER
2675	11

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/530,099	YOKOYAMA ET AL.
	Examiner	Art Unit
	Leland R. Jorgensen	2675

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 December 2002 .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 21 - 27 and 29 - 49 is/are pending in the application.

4a) Of the above claim(s) 1 - 20 and 28 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 21 - 27 and 29 - 49 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 21, 22, 25, 26, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al., USPN 5,707,745 in view of Lengyel, USPN 5,754,262.

Claim 21

Claim 21 (amended) describes a light source. Forrest teaches a light source comprising a plurality of organic electroluminescent elements [LED 20, 21, 22] arrayed on a same substrate [glass substrate 37]. Forrest, col. 2, lines 62 – 65; col. 3, line 66 – col. 4, line 6; and col 5, lines 4 – 16. The plurality of organic electroluminescent elements emits light simultaneously. Forrest, col. 6, lines 28 – 31.

Claim 21 as amended adds P being a distance between the adjacent organic electroluminescent elements and D being a distance between each organic electroluminescent element and the display surface of the display element, and a relationship between D and P being such that D is 10 times P or more. Forrest, in figure 2B, shows a distance P between each adjacent organic electroluminescent elements [LED 20, 21, and 22] being composed of a layer 26M of 50 – 100 Å plus a layer 26I of 1000 – 4000 Å [1 Å = 10^{-10} meters]. Forrest, col. 4, lines 40 – 49. "For optimum performance, each of the layers should preferably be kept towards the lower ends of the above ranges." Forrest, col. 4, lines 47 – 49.

Forrest does not teach a display element nor a distance D between the display element and the organic electroluminescent element. Thus, Forrest does not teach a relationship between D and P being such that D is 10 times P or more.

Lengyel teaches an daylight readable liquid crystal display having a display element 103 and a backlight assembly 103. Lengyel teaches a separation 110 between the display element and the backlight assembly of about 1mm to about 5 mm. Lengyel, col. 5, lines 24 – 49; and figure 1. Thus, it is inherent that D, the separation 110 as taught by Lengyel would be 10 times or more than the distance P, as taught by Forrest, in a combined display device of Lengyel and Forrest.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the backlight assembly of Lengyel with the light source of Forrest to produce a daylight readable liquid crystal display having a backlight assembly of organic electroluminescent elements. Lengyel invites such combination by teaching,

> This invention relates to a display device for displaying images, and more particularly to a liquid crystal display device for generating and displaying images having sufficient contrast to be easily seen in bright daylight.

Lengyel, col. 1, lines 9 – 13. Lengyel adds,

> Therefore, there is currently a need for an LCD which is easily readable in daylight and which is usable over a wide temperature range in direct sunlight.

Lengyel, col. 1, lines 65 – 67. Lengyel then adds,

> A physical separation is preferably provided between the backlight and the display element. The physical separation preferably permits a heat conducting medium to remove heat from the back surface of the display element. This reduces the affects of thermal loading from the backlight assembly.

Lengyel, col. 3, lines 48 – 52. Lengyel invites consideration of different types of backlights by teaching,

> However, any conventional light source having sufficient brightness and similar emissive spectra may be used, such as a conventional fluorescent light fixture, a conventional incandescent light fixture, a halogen light fixture, or any other light source.

Lengyel, col. 4, lines 39 – 44.

Claim 22

Claim 22 is dependant on claim 21 and adds that the plurality of organic electroluminescent elements emit light of one primary color.

Neither Forrest nor Lengyel specifically teach that the plurality of organic electroluminescent elements emit light of one primary color.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have the plurality of organic electroluminescent elements emitting light of one primary color. Forrest invites such by teaching, "It is an object of the present invention to provide a multicolor organic light emitting device employing several types of organic electroluminescent media, each for emitting a distinct color." Forrest invites one to consider alternatives to the specific embodiment described.

> Based on the ability to grow organic materials on a large variety of materials (including metals and ITO), one can construct a stack of LED double heterostructures (DH) designated as 20, 21 and 22, in one embodiment of the invention. For illustrative purposes, LED 20 is considered in a bottom portion of the stack, LED 21 in a middle portion of the stack, and LED 22 in a top portion of the stack, in the example of FIG. 2A. Also, the stack is shown to be vertically oriented in FIG. 2A, but the LED can be otherwise oriented. In other embodiments, a stack of single heterostructure (SH) LED's (see FIG. 1B), or a stack of polymer-based LED devices (see FIG. 1C), are viable alternatives to the DH LED's, with the SH devices being equally viable as DH devices for light emitters.

Forrest, col. 4, lines 2 – 16. Forrest teaches about colors and color combinations,

> Each DH structure 20, 21 and 22 is capable upon application of a suitable bias voltage of emitting a different color light. The double heterostructure LED 20 emits blue light. The double heterostructure LED 21 emits green light while the double heterostructure (DH) LED 22 emits red light. Different combinations or individual ones of LED's 20, 21 and 22 can be activated to selectively obtain a desired color of light for the respective pixel partly dependent upon the magnitude of current in each of the LED's 20, 21 and 22.

Forrest, col. 5, lines 16 – 25. Forrest adds about colors and color combinations,

> As seen in FIGS. 2A, 2B, and 2C, each device DH structure 20, 21 and 22 can emit light designated by arrows B, G and R, respectively, either simultaneously or separately. Note that the emitted light is from substantially the entire transverse portion of each LED 20, 21 and 22, whereby the R, G, and B arrows are not representative of the width of the actual emitted light, respectively. In this way, the addition or subtraction of colors as R, G and B is integrated by the eye causing different colors and hues to be perceived. This is well known in the field of color vision and display colorimetry. In the offset configuration shown, the red, green and blue beams of light are substantially coincident. If the devices are made small enough, that is about 50 microns or less, any one of a variety of colors can be produced from the stack. However, it will appear as one color originating from a single pixel.

Forrest, col. 6, lines 28 – 43.

Claim 25

It would have been obvious to one of ordinary skill in the art at the time of the invention to array the organic electroluminescent elements one-dimensionally on the substrate to provide a display section to form letters and numbers.

Claim 26

It would have been obvious to one of ordinary skill in the art at the time of the invention to array the organic electroluminescent elements two-dimensionally on the substrate to give a display area having both a width and a direction.

Claim 49

Forrest teaches that all of the organic electroluminescent elements on the substrate can emit light simultaneously. Forrest, col. 6, lines 28 – 31.

3. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest in view of Lengyel as applied to claim 21 above, and further in view of Nakayama et al., USPN 5,847,506.

Claim 23

Claim 23 is dependant on claim 21 and adds that the organic electroluminescent elements comprise optical micro-resonators.

Neither Forrest nor Lengyel teach that the organic electroluminescent elements comprise optical micro-resonators.

Nakayama teaches organic electroluminescent elements that comprise optical micro-resonators. Nakayama, col. 3, line 61 – col. 4, line 10; col. 6, lines 42 – 55.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the optical micro-resonators of Nakayama with the light source of Forrest and Lengyel. Nakayama invites such combination by teaching,

> In view of solving the foregoing problems of the prior arts, it is an object of the present invention to provide an organic light emitting device having improved spectra width and light emitting characteristics.
>
> Another object of the present invention is to provide a substrate plate used for an organic light emitting device.

Nakayama, col. 1, lines 37 – 42. Nakayama teaches the following advantages.

> In the organic light emitting device of the present invention, the light micro-resonator can be accomplished therein in the way that the semi-transparent reflective film is place between the transparent electrode and the substrate plate and the optical distance between the reflective film and the rear electrode is made equal to or an integer multiplication of the emitted light wavelength. The micro-resonator can make narrow the half-width of the emitted light spectra. Also, the micro-resonator can increase the light emission efficiency, generate the coherent light, and improve the light emission characteristics.

Nakayama, col. 3, lines 13 – 23.

4. Claims 24, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest in view of Lengyel as applied to claim 21 above, and further in view of Shioya et al., USPN 6,091,382.

Claim 24

Claim 24 adds the organic electroluminescent elements being formed on the substrate at the intersections of an anode formed in a striped pattern in a first direction and a cathode formed in a striped pattern in a second direction orthogonal to the first direction.

Neither Forrest nor Lengyel specifically teach that the organic electroluminescent elements is formed on the substrate at the intersections of an anode formed in a striped pattern in a first direction and a cathode formed in a striped pattern in a second direction orthogonal to the first direction.

Shioya teaches organic electroluminescent elements formed on the substrate at the intersections of an anode [striped anode electrodes 106] formed in a striped pattern in a first direction and a cathode formed [striped cathode electrodes 103] in a striped pattern in a second direction orthogonal to the first direction. Shioya, col. 10, lines 14 – 24; and figure 10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the organic electroluminescent elements and the pulse currents taught by Shioya with the light source for the display device as taught by Forrest and Lengyel. Shioya invites such combination by teaching,

> It is an object of the present invention to provide a display device whose load is small and which performs a proper high time-division display operation with little variation in luminance and little crosstalk among pixels, and to realize a high-resolution, large screen having a high opening ratio and a very low profile.

Shioya, col. 1, line 66 – col. 2, line 4. Shioya invites specifically the combination described by teaching,

> The driving method for the display device of this embodiment has been described above. By using this method, data erase can be arbitrarily performed as well as data write and setting of the data hold time. The driving method of this embodiment is characterized in that driving with a memory function can be performed without crosstalk, obtaining substantially the same effects as those obtained by a liquid crystal display device using TFTs. In addition, since static liquid crystal driving can be performed with a simple matrix electrode structure, high-quality display can be performed.

Shioya, col. 29, lines 40 – 49.

Claim 27

Claim 27 is dependant on claim 21. Shioya teaches a display device for illuminating a display element. Shioya, col. 1, lines 7 – 24; col. 26, line 56 – 61.

Claim 29

Claim 29 is dependant on claim 27. Shioya teaches that the display element is a liquid crystal display element. Shioya, col. 26, line 56 – 61.

5. Claims 30, 31, 33 - 35, 38, 40, 41, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al., USPN 5,185,712, in view of Shioya et al.

Claim 30

Claim 30 is a display device. Sato teaches a display device comprising a light source [light sources 118R, 118G, and 118B]. The light source(s) illuminates a display element [liquid crystal display panel 110 comprised of sections 111R, 111G, 111B]. Sato, col. 11, lines 54 – 66; and figure 8. Sato, in figure 8, shows the first, second, and third light sources having luminescent regions substantially the same size as those of display areas of the first second, and third display elements, respectively. Sato, figure 8. Sato teaches an optical system [eyepiece 115 or projection lens 104] that enlarges and displays the image combined by the combining optical system. Sato, col 9, lines 59 – 61; col. 11, lines 50 – 52; and figures 6 and 8.

Sato does not teach that the light sources are organic electroluminescent elements. Nor does Sato teach a pulse current applied to each of the light sources. Although Sato, in figure 8, shows the light sources having a luminescent region substantially the same size as the display elements, Sato does not specifically teach such.

Shioya teaches light sources that are organic electroluminescent elements and a pulse current applied to the light sources. Shioya, col. 1, lines 7 – 24; col. 26, line 56 – 61; col. 29, lines 26 – 39; and figures 32 – 34. Shioya teaches, "The organic EL element for display light has a display area nearly equal in area to the entire emission area of the organic EL element for signal light." Shioya, col. 16, lines 55 – 57.

For the reasons stated in the discussion about claim 24 above, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the organic

electroluminescent elements and the pulse currents taught by Shioya with the light source for the display device as taught by Sato.

Claim 34

Claim 34 is a display device. Sato teaches a display device comprising a light source. The light source comprises a first light source 118R that emits light in a red color range; a second light source 118G that emits light in a green color range; and a third light source 118G that emits light in a blue color range. Sato teaches first, second and third display elements [display sections 111R, 111G, and 111B] each illuminated by their corresponding light source. Sato, col. 11, lines 54 – 66; and figure 8. Sato teaches a combining optical system [image light synthesizing element 106] that combines images displayed in the first, second, and third display elements. Sato, col. 11, line 67 – col 12. line 9; and figure 8. Sato, in figure 8, shows the first, second, and third light sources having luminescent regions substantially the same size as those of display areas of the first second, and third display elements, respectively. Sato, figure 8. Sato teaches an optical system [eyepiece 115 or projection lens 104] that enlarges and displays the image combined by the combining optical system. Sato, col 9, lines 59 – 61; col. 11, lines 50 – 52; and figures 6 and 8.

Claim 40

Claim 40 is a display device. Sato teaches a display device comprising a light source. The light source comprises a first light source 118R that emits light in a red color range; a second light source 118G that emits light in a green color range; and a third light source 118G that emits light in a blue color range. Sato teaches first, second and third display elements [display sections 111R, 111G, and 111B] each illuminated by their corresponding light source. Sato, col. 11, lines

54 – 66; and figure 8. Sato teaches a combining optical system [image light synthesizing element 106] that combines images displayed in the first, second, and third display elements. Sato, col. 11, line 67 – col 12. line 9; and figure 8. Sato, in figure 8, shows the first, second, and third light sources having luminescent regions substantially the same size as those of display areas of the first second, and third display elements, respectively. Sato, figure 8. Sato teaches an optical system [eyepiece 115 or projection lens 104] that enlarges and displays the image combined by the combining optical system. Sato, col 9, lines 59 – 61; col. 11, lines 50 – 52; and figures 6 and 8.

Sato does not specifically teach that the display element illuminated by the light combined by the combining optical system.

It would have been obvious to one of ordinary skill in the art at the time of the invention to illuminate the display element by the light combined by the combining optical system. Such system would allow a simpler system to drive only one display rather than three and would result in a smaller and less expensive display. Sato invites such consideration of alternative arrangements by teaching,

> The present invention has been made in consideration of such a situation, and has as its object to provide a liquid crystal viewfinder which allows easy arrangement of a liquid crystal panel, can increase the resolution, and can decrease the protrusion height from an image pick up apparatus.

Sato, col. 2, lines 14 – 19. Sato teaches as a variation of certain embodiments that one liquid crystal display and invites one to consider numerous arrangements of the display.

> In the above-described embodiment, the display sections 111R, 111G, and 111B for respectively displaying red, green, and blue images are formed on the single liquid crystal display panel 110. However, the display sections 111R, 111G, and 111B may be formed as separate liquid crystal display panels. In addition, these display sections 111R, 111G, and 111B are not limited to a liquid

> crystal display panel, and may be formed as a CRT or the like. Furthermore, the image light synthesizing element 106 is not limited to the dichroic prism obtained by bonding four prisms together, but may be constituted by an X type dichroic prism obtained by combining dichroic mirrors in the form of the letter "X".
>
> In the above-described embodiment, a display apparatus for synthesizing the red, green, and blue image light beams A_R, A_G, and A_B from the three display sections 111R, 111G, and 111B into one full-color image light beam A_{RGB} is exemplified. It is apparent that the present invention can be applied to various display apparatuses, e.g., a display apparatus wherein each of the display sections 111R, 111G, and 111B in the above embodiment is divided into two display sections for respectively displaying one and the other halves of an image, and red, green, and blue image light beams from these pairs of display sections, i.e., a total of six display sections are synthesized into on full-color image light beam, and a display apparatus wherein a display section for displaying an image or images of one or two of red, green, and blue, and a display section for displaying an image or image of the other two or one colors are respectively arranged at the positions of the green image display section 111G and of the red or blue image display section 111R or 111B, and the respective color image light beams from these two display sections are synthesized into one full-color image light beam.

Sato, col. 12, line 57 – col. 13, line 24. Sato concludes,

> However, the present invention can be applied to any liquid crystal display apparatus as long as it has three display sections 215a, 215b, and 125c corresponding to red, blue, and green arranged on the same plane. In addition, the present invention is not limited to the above-described embodiments. Various changes and modifications can be made within the spirit and scope of the invention.
>
> Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, and representative devices, shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

Sato, col. 14, lines 23 – 38.

Claims 31, 35, and 41

Claim 31 is dependant on claim 30. Claim 35 is dependant on claim 34. Claim 41 is dependant on claim 40. Both Sato and Shioya teach that the display element is a liquid crystal display element. Sato, col. 11, lines 54 – 66. Shioya, col. 26, line 56 – 61.

Claims 33, 38, and 44

Claim 33 is dependant on claim 30. Claim 38 is dependant on claim 34. Claim 44 is dependant on claim 40. Shioya teaches that the organic electroluminescent elements have micro-resonator structures. Shioya, col. 26, lines 38 – 55.

6. Claims 32, 36, 37, 39, 42, 43, and 45 - 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al in view of Shioya et al. as applied to claims 30, 43, or 40 above, and further in view of Forrest et al.

Claims 32, 36, and 42

Claim 32 is dependant on claim 30. Claim 36 is dependant on claim 34. Claim 42 is dependant on claim 40. Each describes at least one of a peak current, a frequency, and a pulse width of the pulse current being controlled in order to adjust the luminance of the organic electroluminescent elements. Shioya teaches both pulse width and pulse height (peak current) modulation to control the display element. Shioya, col. 29, lines 26 – 28.

Neither Shioya nor Sato specifically teach a pulse current to adjust the luminance of the light source.

Forrest teaches pulse width modulation to adjust the luminance of organic electroluminescent elements. Forrest, col. 14, lines 58 – 66.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the pulse width modulation to adjust the luminance of the organic electroluminescent elements as taught by Forrest with the display device as taught by Shioya and Sato. Forrest invites such combination by teaching the following objects.

> It is an object of the present invention to provide a multicolor organic light emitting device employing several types of organic electroluminescent media, each for emitting a distinct color.
>
> It is a further object of this invention to provide such a device in a high definition multicolor display in which the organic media are arranged in a stacked configuration such that any color can be emitted from a common region of the display.
>
> It is another object of the present invention to provide a three color organic light emitting device which is extremely reliable and relatively inexpensive to produce.
>
> It is a further object to provide such a device which is implemented by the growth of organic materials similar to those materials used in electroluminescent diodes, to obtain an organic LED which is highly reliable, compact, efficient and requires low drive voltages for utilization in RGB displays.

Forrest, col. 2, line 62 – col. 3, line 12. Forrest concludes,

> This device can be used to provide a low cost, high resolution, high brightness full color, flat panel display of any size. This widens the scope of this invention to displays as small as a few millimeters to the size of a building but to a practice limit. The images created on the display could be text or illustrations in full color, in any resolution depending on the size of the individual LED's.

Forrest, col. 15, lines 59 – 65.

Claims 37 and 43

Claim 37 is dependant on claim 34. Claim 43 is dependant on claim 40. Shioya teaches both pulse width and pulse height (peak current) modulation to independently control each display element to adjust the color of the display image. Shioya, col. 29, lines 26 – 39. Forrest

teaches that different combinations or individual electroluminescent elements can be controlled to obtain a desired color. Forrest, col. 5, lines 21 – 25.

Claims 39 and 45

Claim 39 is dependant on claim 34. Claim 45 is dependant on claim 40. Forrest teaches each of a plurality of electroluminescent elements emitting light simultaneously. Forrest, col. 6, lines 27 – 44.

Claim 46

Claim 46 is a display device. Sato teaches a display device comprising a light source [light sources 118R, 118G, and 118B]. The light source(s) illuminates a display element [liquid crystal display panel 110 comprised of sections 111R, 111G, 111B]. Sato, col. 11, lines 54 – 66; and figure 8. Sato teaches an optical system [eyepiece 115 or projection lens 104] that enlarges and displays the image combined by the combining optical system. Sato, col 9, lines 59 – 61; col. 11, lines 50 – 52; and figures 6 and 8.

Forrest teaches a light source comprising a plurality of organic electroluminescent elements [LED 20, 21, 22] arrayed on a same substrate [glass substrate 37]. Forrest, col. 2, lines 62 – 65; col. 3, line 66 – col. 4, line 6; and col 5, lines 4 – 16. The plurality of organic electroluminescent elements emitting light simultaneously. Forrest, col. 6, lines 28 – 31. Forrest teaches pulse width modulation to adjust the luminance of organic electroluminescent elements. Forrest, col. 14, lines 58 – 66.

Shioya teaches light sources that are organic electroluminescent elements and a pulse current applied to the light sources. Shioya, col. 1, lines 7 – 24; col. 26, line 56 – 61; col. 29, lines 26 – 39; and figures 32 – 34.

Claim 47

Claim 47 is a display device. Sato teaches a display device comprising a light source. The light source comprises a first light source 118R that emits light in a red color range; a second light source 118G that emits light in a green color range; and a third light source 118G that emits light in a blue color range. Sato teaches first, second and third display elements [display sections 111R, 111G, and 111B] each illuminated by their corresponding light source. Sato, col. 11, lines 54 – 66; and figure 8. Sato teaches a combining optical system [image light synthesizing element 106] that combines images displayed in the first, second, and third display elements. Sato, col. 11, line 67 – col 12. line 9; and figure 8. Sato, in figure 8, shows the first, second, and third light sources having luminescent regions substantially the same size as those of display areas of the first second, and third display elements, respectively. Sato, figure 8. Sato teaches an optical system [eyepiece 115 or projection lens 104] that enlarges and displays the image combined by the combining optical system. Sato, col 9, lines 59 – 61; col. 11, lines 50 – 52; and figures 6 and 8.

Forrest teaches a light source comprising a plurality of organic electroluminescent elements [LED 20, 21, 22] arrayed on a same substrate [glass substrate 37]. Forrest, col. 2, lines 62 – 65; col. 3, line 66 – col. 4, line 6; and col 5, lines 4 – 16. The plurality of organic electroluminescent elements emitting light simultaneously. Forrest, col. 6, lines 28 – 31. Forrest teaches pulse width modulation to adjust the luminance of organic electroluminescent elements. Forrest, col. 14, lines 58 – 66.

Shioya teaches light sources that are organic electroluminescent elements and a pulse current applied to the light sources. Shioya, col. 1, lines 7 – 24; col. 26, line 56 – 61; col. 29, lines 26 – 39; and figures 32 – 34.

Claim 48

Claim 48 is dependant on claim 47. Forrest teaches each of a plurality of electroluminescent elements emitting light simultaneously. Forrest, col. 6, lines 27 – 44.

Response to Arguments

7. Applicant's arguments with respect to claim 28, now incorporated into claim 21, have been considered but are moot in view of the new ground(s) of rejection.

Examiner rejected claim 28 under 35 U.S.C. 103(a) as being unpatentable over Forrest in view of Shioya et al. and further in view of Sato et al. Examiner argued that Sato, in figure 8, shows a several centimeter gap between display element 110 and the light sources 118R, 118G, and 118B. In response, applicant argued that the pictured gap is neither described or explained. Thus, examiner had not reason to assume that Sato's gap in Sato was a several centimeters. Examiner has now provided new grounds of rejection.

8. Applicant's arguments concerning claims 27 and 29 and independent claims 30, 34, 40, 46 and 47 have been fully considered but they are not persuasive.

Examiner rejected claims 27 and 29 over Forrest in view of Shioya. In response, applicant argued,

> However, Shioya discloses a structure constituted by two sets of organic EL elements, in which electrical resistance of an optical conductive film contacting

> another organic EL element changes, and light emission of the organic EL element is controlled by the change in the electrical resistance. Therefore, conversion in Shioya is as follows: light -> electricity -> light. In contrast, in the claimed invention, light is optically controlled by a display which is spatially distant, so there is a conversion of light to light. Further, according to the structure of Shioya, the respective elements are spatially attached to the display, which is different from the claimed invention.

Amendment, page 3. While this may be true for the invention intended by applicant, such limitations are not stated in claims 27 and 29 and the rejection stands.

As to independent claims 30, 34, 40, 46 and 47, applicant argues that none of the applied references disclose a pulse current. Shioya merely disclosed a drive voltage pulse. It is inherent that a drive voltage pulse would include a pulse current as in a standard electrical circuit with a constant resistance, the current is directly proportional to the voltage.

Examiner rejected claims 34 and 40 rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Shioya et al. In response, applicant argued that Sato teaches an ordinary bulb. Applicant argues, "The use of an organic EL element would not be obvious from the teaching of the use of an ordinary bulb." Amendment, page 3. Sato teaches a light source. Sato teaches that the light source can be panel-like light sources using fluorescent lamps. Sato, col. 11, lines 61 – 66. In the rejection, examiner acknowledged that Sato did not teach an organic EL element used as a light source, but that Shioya taught an organic EL element used as a light source. For the reasons stated in the rejection, it would have been obvious to combine Sato and Shioya.

Applicant also argues,

> Further, Forrest discloses organic EL elements that are vertically laminated (in a vertical direction). In contrast, organic EL elements according to the present invention are horizontally aligned on the same substrate and light is simultaneously emitted (usually, elements (pixels) which are horizontally aligned

> do not simultaneously emit light because various images need to be output, and pixels are needed to be lit sequentially, so light cannot be simultaneously emitted).

Amendment, page 4. Examiner finds no such limitation in the claim and the rejections stand.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Farchmin et al., USPN 5,567,042, and Plesinger, USPN 5,146,354, teach a gap between the display and the backlight. Farchmin teaches a gap of ¼ to 3/8 inches.

Sano et al., USPN 5,779,937; Shi et al., USPN 5,886,464; Ohnishi et al., USPN 5,589,320; Pichler, USPN 5,929,562; and Vleggaar et al., USPN 6,160,346, teach a organic electroluminescent device used as a backlight.

T. Rivera et al., "Reduced Threshold All-Optical Bistability in Etched Quantum Well Microresonators," Appl. Phys. Letter 64(7) February 14, 1994, pp. 869 – 871.

A. Scherer et al., "Fabrication of Microlasers and Microresonator Optical Switches," Appl. Phys. Letter 55 (26), Dec. 25, 1980, pp. 2724 – 2726.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leland Jorgensen whose telephone number is 703-305-2650. The examiner can normally be reached on Monday through Friday, 7:00 a.m. through 3:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven J. Saras can be reached on 703-305-9720.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, telephone number (703) 306-0377.

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STEVEN SARAS
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TECHNOLOGY CENTER 2600